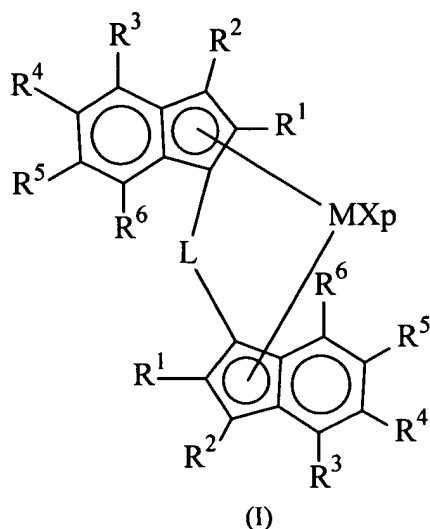


AMENDMENTS TO THE CLAIMS

1. (currently amended) A process for preparing 1-butene polymers optionally containing up to 30% by mol of derived units of ethylene, propylene or an alpha olefin of formula $\text{CH}_2=\text{CHZ}$, wherein Z is a $\text{C}_3\text{-C}_{10}$ alkyl group, comprising polymerizing 1-butene and optionally ethylene, propylene or said alpha olefin, in the presence of a catalyst system obtained by contacting:

a) at least a metallocene compound of formula (I):



wherein:

M is an atom of a transition metal selected from those belonging to group 3, 4, 5, 6 or to the lanthanide or actinide groups in the Periodic Table of the Elements;

p is 2, being equal to the formal oxidation state of the metal M minus 2;

X, equal to or different from each other, are hydrogen atoms, halogen atoms, ~~or~~ R, OR, OSO_2CF_3 , OCOR , SR, NR_2 or PR_2 groups, wherein R is a linear or branched, ~~saturated or unsaturated~~ $\text{C}_1\text{-C}_{20}$ alkyl, $\text{C}_3\text{-C}_{20}$ cycloalkyl, $\text{C}_6\text{-C}_{20}$ aryl, $\text{C}_7\text{-C}_{20}$ alkylaryl or $\text{C}_7\text{-C}_{20}$ arylalkyl radical, optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; or a $\text{OR}'\text{O}$ group wherein R' is a divalent radical selected from $\text{C}_1\text{-C}_{20}$ alkylidene, $\text{C}_6\text{-C}_{40}$ arylidene, $\text{C}_7\text{-C}_{40}$ alkylarylidene ~~and/or~~ $\text{C}_7\text{-C}_{40}$ arylalkylidene radicals;

R^1 , equal to or different from each other, are linear or branched, ~~saturated or unsaturated~~ $\text{C}_1\text{-C}_{20}$ -alkyl, $\text{C}_3\text{-C}_{20}$ -cycloalkyl, $\text{C}_6\text{-C}_{20}$ -aryl, $\text{C}_7\text{-C}_{20}$ -alkylaryl or

C₇-C₂₀-arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

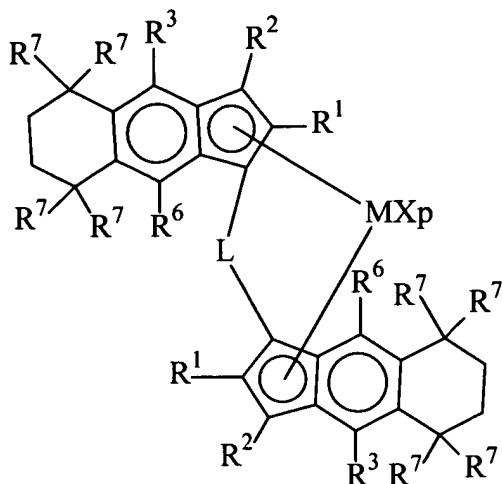
R², R³ and R⁶, equal to or different from each other, are hydrogen atoms or linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl,

C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

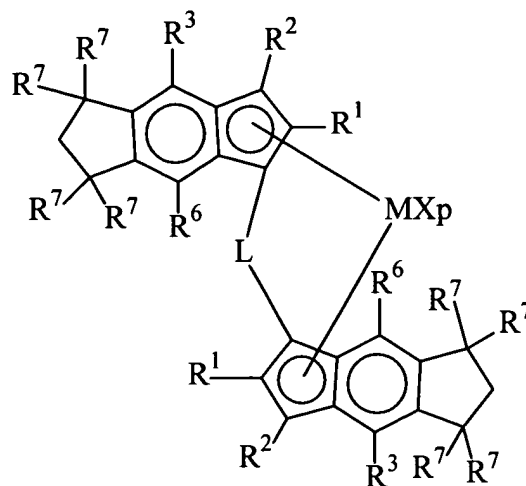
R⁴ and R⁵, form together a condensed saturated or ~~unsaturated~~ unsaturated C₃-C₇ membered ring optionally containing heteroatoms belonging to groups 13-16 of the Periodic Table of the Elements; every atom forming said ring being substituted with R⁷ radicals wherein R⁷, equal to or different from each other, are hydrogen atoms or linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

L is a ~~divalent bridging group selected from C₁-C₂₀-alkylidene, C₃-C₂₀-cycloalkylidene, C₆-C₂₀-arylidene, C₇-C₂₀-alkylarylidene, or a C₇-C₂₀-arylalkylidene radical optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements, or a silylidene radical containing up to 5 silicon atoms~~ Si(R⁸)₂ wherein R⁸ is a linear or branched, C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radical; and

- b) an alumoxane or a compound that forms an alkylmetallocene cation.
2. (original) The process according to claim 1 wherein the catalyst system further comprises an organo aluminum compound.
 3. (currently amended) The process according to claim 1, wherein in the compound of formula (I), M is titanium, zirconium or hafnium; and X is a hydrogen atom, a halogen atom or an R group ~~and L is Si(R⁸)₂, wherein R⁸ is a linear or branched, saturated or unsaturated C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radical.~~
 4. (currently amended) The process according to claim 1 wherein R¹ is a C₁-C₂₀-alkyl radical; R², R³ and R⁶ are hydrogen atoms and R⁷ is a hydrogen atom or a linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl radical.
 5. (previously presented) The process according to claim 1 wherein the compound of formula (I) has formula (IIa) or (IIb):

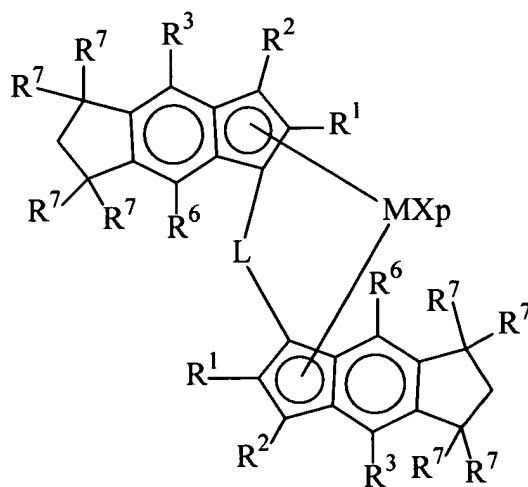


(IIa)



(IIb).

6. (previously presented) The process according to claim 1 wherein 1-butene is homopolymerized.
7. (currently amended) A metallocene compound of formula (IIb):



(IIb)

wherein

M is an atom of a transition metal selected from those belonging to group 3, 4, 5, 6 or to the lanthanide or actinide groups in the Periodic Table of the Elements;

p is 2, being equal to the formal oxidation state of the metal M minus 2;

L is a divalent bridging group selected from C_1 - C_{20} alkylidene, C_3 - C_{20} cycloalkylidene, C_6 - C_{20} arylidene, C_7 - C_{20} alkylarylidene, or a C_7 - C_{20} arylalkylidene radical optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements, or a

~~silylidene radical containing up to 5 silicon atoms~~ $\text{Si}(\text{R}^8)_2$ wherein R^8 is a linear or branched, $\text{C}_1\text{-C}_{20}$ -alkyl, $\text{C}_3\text{-C}_{20}$ -cycloalkyl, $\text{C}_6\text{-C}_{20}$ -aryl, $\text{C}_7\text{-C}_{20}$ -alkylaryl or $\text{C}_7\text{-C}_{20}$ -arylalkyl radical;

R^1 , equal to or different from each other, are linear or branched, ~~saturated or unsaturated~~ $\text{C}_1\text{-C}_{20}$ -alkyl, $\text{C}_3\text{-C}_{20}$ -cycloalkyl, $\text{C}_6\text{-C}_{20}$ -aryl, $\text{C}_7\text{-C}_{20}$ -alkylaryl or $\text{C}_7\text{-C}_{20}$ -arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

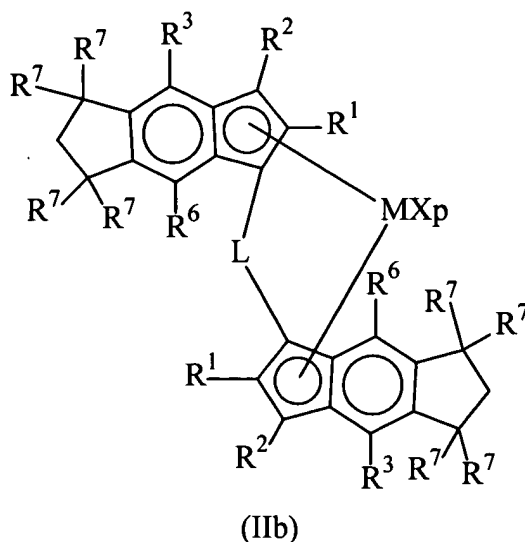
R^2 , R^3 and R^6 , equal to or different from each other, are hydrogen atoms or linear or branched, ~~saturated or unsaturated~~ $\text{C}_1\text{-C}_{20}$ -alkyl, $\text{C}_3\text{-C}_{20}$ -cycloalkyl, $\text{C}_6\text{-C}_{20}$ -aryl, $\text{C}_7\text{-C}_{20}$ -alkylaryl or $\text{C}_7\text{-C}_{20}$ -arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

R^7 , equal to or different from each other, are ~~hydrogen atoms or~~ linear or branched, ~~saturated or unsaturated~~ $\text{C}_1\text{-C}_{20}$ -alkyl, $\text{C}_3\text{-C}_{20}$ -cycloalkyl, $\text{C}_6\text{-C}_{20}$ -aryl, $\text{C}_7\text{-C}_{20}$ -alkylaryl or $\text{C}_7\text{-C}_{20}$ -arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

X, equal to or different from each other, are hydrogen atoms, halogen atoms, ~~or~~ R, OR, OSO_2CF_3 , OCOR, SR, NR_2 or PR_2 groups, wherein R is a linear or branched, ~~saturated or unsaturated~~ $\text{C}_1\text{-C}_{20}$ alkyl, $\text{C}_3\text{-C}_{20}$ cycloalkyl, $\text{C}_6\text{-C}_{20}$ aryl, $\text{C}_7\text{-C}_{20}$ alkylaryl or $\text{C}_7\text{-C}_{20}$ arylalkyl radical, optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; or a OR'O group wherein R' is a divalent radical selected from $\text{C}_1\text{-C}_{20}$ alkylidene, $\text{C}_6\text{-C}_{40}$ arylidene, $\text{C}_7\text{-C}_{40}$ alkylarylidene ~~and/or~~ $\text{C}_7\text{-C}_{40}$ arylalkylidene radicals.

8. (cancelled)

9. (currently amended) A process for preparing a metallocene compound of formula (IIb):



wherein

M is an atom of a transition metal selected from those belonging to group 3, 4, 5, 6 or to the lanthanide or actinide groups in the Periodic Table of the Elements;

p is 2, being equal to the formal oxidation state of the metal M minus 2;

L is a ~~divalent bridging group selected from C₁-C₂₀-alkylidene, C₃-C₂₀-cycloalkylidene, C₆-C₂₀-arylidene, C₇-C₂₀-alkylarylidene, or a C₇-C₂₀-arylalkylidene radical optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements, or a silylidene radical containing up to 5 silicon atoms~~ Si(R⁸)₂ wherein R⁸ is a linear or branched, C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radical;

R¹, equal to or different from each other, are linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

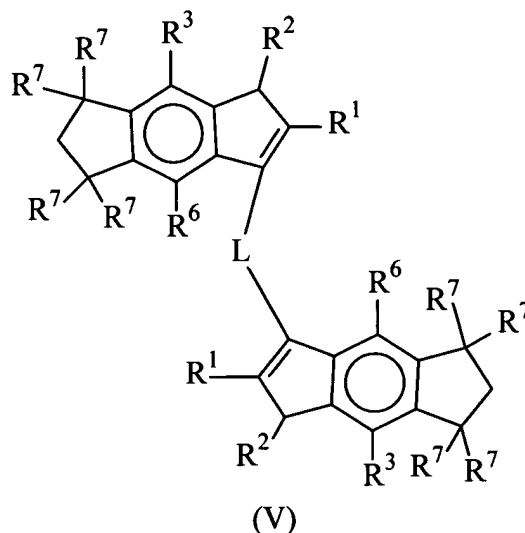
R², R³ and R⁶, equal to or different from each other, are hydrogen atoms or linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radicals, optionally containing one or more heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements;

R⁷, equal to or different from each other, are ~~hydrogen atoms or~~ linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements;

X, equal to or different from each other, are hydrogen atoms, halogen atoms, ~~or R~~, OR, OSO₂CF₃, OCOR, SR, NR₂ or PR₂ groups, wherein R is a linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀ alkyl, C₃-C₂₀ cycloalkyl, C₆-C₂₀ aryl, C₇-C₂₀ alkylaryl or C₇-C₂₀ arylalkyl radical, optionally containing heteroatoms belonging to groups 13-17 of the Periodic Table of the Elements; or a OR'O group wherein R' is a divalent radical selected from C₁-C₂₀ alkylidene, C₆-C₄₀ arylidene, C₇-C₄₀ alkylarylidene ~~and~~ or C₇-C₄₀ arylalkylidene radicals;

comprising the following steps:

a) contacting a ligand of formula (V)



or its double bond isomer

with a base of formula T_jB or TMgT¹, or sodium or potassium hydride, or metallic sodium or potassium; wherein B is an alkaline or alkali-earth metal and j is 1 or 2, j being equal to 1 when B is an alkaline metal, and j being equal to 2 when B is an alkali-earth metal; T is selected from the group consisting of linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀ alkyl, C₃-C₂₀ cycloalkyl, C₆-C₂₀ aryl, C₇-C₂₀ alkylaryl or C₇-C₂₀ arylalkyl groups, optionally containing at least one Si or Ge atom; T¹ is a halogen atom or a group OR'' wherein R'' is a linear or branched, ~~saturated or unsaturated~~ C₁-C₂₀-alkyl, C₃-C₂₀-cycloalkyl, C₆-C₂₀-aryl, C₇-C₂₀-alkylaryl or C₇-C₂₀-arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements; wherein the molar ratio between said base and the ligand of the formula (V) and is at least 2:1; and

b) contacting the product obtained in step a) with a compound of formula MX₄.

10. (cancelled)
11. (cancelled)
12. (new) The process according to claim 5 wherein R^7 , equal to or different from each other, are linear or branched, C_1 - C_{20} -alkyl, C_3 - C_{20} -cycloalkyl, C_6 - C_{20} -aryl, C_7 - C_{20} -alkylaryl or C_7 - C_{20} -arylalkyl radicals, optionally containing at least one heteroatom belonging to groups 13-17 of the Periodic Table of the Elements.
13. (new) The process according to claim 12 wherein formula I is formula IIa.
14. (new) The process according to claim 12 wherein formula I is formula IIb.